Entergy

Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

Marty L. Richey
Director, Nuclear Safety Assurance
Grand Gulf Nuclear Station
Tel. (601) 437-6787

GNRO-2012/00028

April 19, 2012

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Licensee Event Report 2012-002-00 Manual Reactor Scram Due to a Steam Supply Motor Operated Valve Failure that Resulted in the Inability to Maintain Reactor Water Level.
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2012-002-00 which is a final report. This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B)

This letter does not contain any commitments. Should you have any questions regarding the attached report, please call Christina L. Perino at 601-437-6299.

Respectfully,

MLR/jas

Attachment: Licensee Event Report (LER) 2012-002-00

cc: (see next page)

cc: Mr. Elmo Collins
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
1600 East Lamar Boulevard
Arlington, TX 76011-4511

NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U. S. Nuclear Regulatory Commission
ATTN: Mr. A. B. Wang, NRR/DORL (w/2)
Mail Stop OWFN 8 B1
Washington, DC 20555-0001

Attachment
To
GNRO-2012/00028

Licensee Event Report (LER) 2012-002-00

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Manual Reactor Scram Due to a Steam Supply Motor Operated Valve Failure that Resulted in the Inability to Maintain Reactor Water Level

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	N/A
02	19	2012	2012	– 002	– 00	04	19	2012	FACILITY NAME: N/A	DOCKET NUMBER: N/A

9. OPERATING MODE

1

10. POWER LEVEL

022

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Christina Perino / Licensing Manager	601-437-6299

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	SJ	20	P305	Y	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
N/A	N/A	N/A

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On February 19, 2012, at 1904 hours Central Standard Time (CST), Grand Gulf Nuclear Station (GGNS) was in Mode 1 operating at approximately 22 percent power during a planned plant shutdown with the Reactor Feed Pump A (RFP A) secured when a manual reactor scram was initiated due to decreasing reactor pressure vessel (RPV) water level. The cause of the event was a combination of the isolating steam valve to the Reactor Feed Pump B (RFP B) being out of position, ninety percent closed, which isolates the main steam header from RFP B and a planned power reduction. The power reduction resulted in the turbine bypass valves (TBPV) opening as designed, then when the TBPVs reached 16 percent open, RFP B began to decrease in speed. This resulted in a decreasing level in the RPV. As level decreased, the Control Room Supervisor directed a manual scram be inserted prior to reaching the low level scram set point (+11.4 inches narrow range). After the scram, Reactor Core Isolation Cooling (RCIC) was manually started to inject water into the RPV and RFP A was restarted to restore and maintain reactor water level. The appropriate off-normal event procedures were entered to mitigate the transient with all systems responding as designed. All control rods inserted to shut down the reactor. No emergency core cooling system (ECCS) initiation setpoint was reached and no safety relief valves (SRVs) lifted. The normal heat sink (main condenser) remained available during this event.

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NARRATIVE

A. REPORTABLE OCCURRENCE

This LER is being submitted pursuant to 50.73(a)(2)(iv)(A) for a manual initiation of the Reactor Protection System (RPS) (JC) and a manual initiation of Reactor Core Isolation Cooling (RCIC) (BM). Telephonic notification was made on February 19, 2012, to the NRC Emergency Notification System (ENS) within 4 hours of the event pursuant to 10 CFR 72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A).

B. INITIAL CONDITIONS

At the time of the event, the reactor was in operational mode 1 with reactor power at approximately 22 percent. There were no additional inoperable structures, systems, or components at the start of the event that contributed to this event. Post event it was discovered that the High Pressure Steam Inlet valve (SB) to the B Reactor Feed Pump (B RFP) (SJ) was failed ninety percent closed.

C. DESCRIPTION OF OCCURRENCE

On February 19, 2012, at 1904 hours Central Standard Time (CST), during a planned plant shutdown, a manual reactor scram was initiated at approximately +14 inches narrow range reactor pressure vessel (RPV) (AC) level prior to reaching the low RPV level automatic scram setpoint of +11.4 inches. Prior to the scram, with the reactor at approximately 22 percent thermal power, and main turbine load at approximately 220 megawatt electric (MWe), the Reactor Operator began decreasing load by decreasing speed demand on the main turbine generator (TB). When the turbine bypass valves (TBPV) (JI) began to open and reached approximately 16% combined open on all 3 TBPVs, the B RFP began to reduce speed. This resulted in water level decreasing in the RPV. As level decreased, the Control Room Supervisor directed a manual scram be inserted prior to reaching the low level scram set point of +11.4 inches. After the scram, the RCIC system was initiated to inject water into the RPV and the A Reactor Feedwater Pump (A RFP) (SJ) was restarted to restore RPV level. All withdrawn control rods inserted to the full in position; twenty-three (23) control rods did not indicate a position of 00, but did have their green "full-in" indication. Subsequent investigation determined these twenty-three rods fully inserted past position 00 but did not settle back to position 00.

The steam supply for the Reactor Feed Pump Turbines (RFPTs) is normally superheated, low pressure, steam from the Moisture Separator/Reheater (MSR) (SB) outlets. Each RFPT has an additional supply line from the main steam equalizing header for startup and low power operation. Each of the steam supply lines has a motor-operated isolation valve. During a plant shutdown, the steam pressure exiting the MSR decreases and the RFPT governor opens allowing additional Low Pressure (LP) steam from the MSR to the RFPT. When the governor reaches approximately fifty percent open the High Pressure (HP) steam from the main steam equalizing header is admitted to the RFPT effectively transferring the RFPT steam supply from the MSR to the main steam equalizing header.

The High Pressure Steam Inlet valve to B RFPT was out of position at ten percent open versus the normal one hundred percent open. This condition precluded the transfer of the B RFPT to high pressure steam when the normal steam supply became inadequate due to the TBPVs opening as designed. As a result, the B RFPT did not have enough energy to ensure the B RFP maintained reactor water level. The William Powell Company is the manufacturer of the model 19023WE valve which uses a Limitorque model SMB-0-25 valve operator.

No loss of offsite or Engineered Safety Feature (ESF) power occurred. No Emergency Core Cooling System (ECCS) initiation setpoint was reached and no Safety Relief Valves (SRVs) lifted. All safety related equipment operated as expected. The normal heat sink (main condenser) remained available during this event. After the scram, the RCIC system was initiated to inject water into the RPV and the A RFP was restarted to restore RPV level.

D. ROOT CAUSE

The cause of the event was that equipment deficiencies prevented the High Pressure Steam Inlet valve to B RFPT from fully opening.

Contributing to the root cause was: Operations lacked rigor in the application of the operator fundamental of control and conservatism as evidenced by the acceptance of the low standards used in implementation of the caution tag on the control switch for the High Pressure Steam Inlet valve to the B RFPT and acceptance of not having an additional tracking mechanism for positioning the valve. Operations did not display appropriate conservative decision making in regards to the B RFPT High Pressure Steam Inlet valve dual indication and in the decision making process during the removal of the RFPTs from service.

E. CORRECTIVE ACTIONS

Reactor water level was restored and the plant was placed in a stable condition. Condition Report (CR) CR-GGN-2012-01842 was written to document and investigate the event and a root cause evaluation was conducted. The root cause evaluation resulted in several immediate actions to address the contributing cause: all caution tags were reviewed for quality; an action was issued to update selected caution tags to improve quality; and a training evaluation analysis request (TEAR) TEAR-GGNS-2012-145 was issued to develop training (both classroom and simulator) on this event to improve Operator performance and decision making. As an interim corrective action, the Operations Manager issued a letter of expectations to the Operations Department to reinforce the importance of and the need to maintain high standards. Long term corrective actions will address the root cause by troubleshooting and repair of the High Pressure Steam Inlet valve to B RFPT during Refueling Outage 18 (RF18). Using the results of the troubleshooting, a corrective action to prevent reoccurrence (CAPR) will be developed. Additional long term actions are: develop and implement a configuration control program to enable the tracking of off normal components in a readily accessible database; institutionalize and reinforce the expectation to review outstanding danger tags, caution tags, and component position control (CPC) tags prior to performing select evolutions; perform an assessment on operator fundamentals in which the assessment should be performed at least 6 months after the Corrective Action Review Board approval of this root cause; perform observations of operator standards of excellence in application of the operator fundamentals of conservatism and control for a 5 month period; provide refresher High Impact Training (driven by TEAR-GGNS-2012-209 in the areas of operator fundamental conservatism; perform an in-depth review with Operations on selected systems to identify unknown or longstanding equipment issues that pose a challenge to safe operations of the plant; perform an in-depth review with the Radwaste Supervisor to identify unknown or longstanding equipment issues that pose a challenge to Radwaste Operations; and complete work to troubleshoot and repair N62F024B Steam Jet Air Ejector B motor operated valve manual disengage not working and 1P44F021A motor operated valve indication issue.

F. SAFETY ASSESSMENT

Immediate actions performed by the Operations staff were adequate and appropriate in placing and maintaining the reactor in a safe shutdown condition. The lowest reactor level indicated was -38 inches Wide Range level indication. Reactor vessel water level never dropped to the ECCS initiation setpoint. Reactor water level was restored and maintained by the condensate and feedwater system following the restart of the A RFPT. The Group 2 Residual Heat Removal (RHR) to Radwaste and Group 3 RHR Shutdown Cooling automatic isolations were received at +11.4 inches reactor level, however no valves isolated because they were in their normally closed position prior to the event.

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NARRATIVE

SAFETY ASSESSMENT (continued)

No Safety Relief Valves lifted as a result of this event and all other systems performed as required. The manual reactor scram resulted in all the systems performing as intended. A level 3 isolation signal was generated due to RPV water level falling below the initiation setpoint of +11.4 inches which is also a setpoint for Group 2 (Residual Heat Removal (RHR) to Radwaste) and Group 3 (Shutdown Cooling Isolation). No valves isolated in these systems due to their being in their normally closed position. The appropriate off-normal event procedures were implemented to mitigate the transient with all systems responding as designed after the scram. The lowest reactor water level observed was approximately -38 inches as indicated on Wide Range level. There were no safety system functional failures. Based on the discussion provided above, the health and safety of the public was not compromised by this event.

G. ADDITIONAL INFORMATION

Previous Similar Events: Pursuant to 10CFR50.73 (b)(5) this issue is considered an infrequent event. There has not been any occurrence of the same underlying concern in the past three years at Grand Gulf Nuclear Station. Although GGNS has experienced RFPT transients and/or scrams in the past, this event was caused by a circumstance involving a failed steam supply valve in conjunction with removing a reactor feed water pump from service for a planned shutdown. Condition Report (CR) GGN-2010-01503 documented Automatic Reactor Scram On Decreasing Reactor Water Level Due To Inadvertent Reactor Feed Pump Trip that was caused by a unique combination of circumstances involving both trains (i.e., steam leaks inducing electrical faults on train 'B' along with control valve linkage binding on train 'A') and did not have the same underlying concern as this scam.